Table 2 Formulation Component

Principal agent	XA-1	XA-2	XA-3	XA-4	XA-5	XX-1	XX-2
A−1	30	20	15				
A−3				125			
B−1	108	123	131		75	154	
D−1					105.3		105.3
KAYARAD DPHA *6	16	16	16	16		16	
KAYARAD DPCA-60 *7					20		60
I907 *8	10	10	10	10		10	
DETX−S *9	1.2	1.2	1.2	1.2		1.2	
Diethylaminobenzophenone					0.1		0.1
Benzophenone					5.0		5.0
Victoria Pure Blue					0.2		0.2
Fine silica	10	10	10	10		10	
Melamine monomer	1.2	1.2	1.2	1.2		1.2	
Hexamethoxy melamine					10		10
KS−66 *10	1.0	1.0	1.0	1.0		1.0	
MEK					45		45

(Note)

* 6: Dipentaerythritol(penta and hexa)acrylate mixture

* 7:Dipentaerythritol- ε - caprolactone additive poly-acrylate

* 8:Irgacure907:2-methyl-1-[4-(methylthio)phenyl-2-morpholino -propan-1-one] made by Ciba Geigy

* 9 : Diethylthioxanthone made by NIPPON KAYAKU KK

* 10: A silicone antifoamer made by Shin-Etsu Chemicals KK

Table 3 Formulation Component(parts by weight)

		H−1	H−2	H−3	H−4
Epicoat1001	*1	66	30		
YR−528	*2		20		
YX−4000	*3			30	
DEN−438	*4				30

(Note)

* 1: Epicoat1001: Bisphenol A epoxy resin(containing carbitol acetate, a solid concentration of 75%)made by Yuka Shell Epoxy KK

* 2 : YR-528: a gum denatured epoxy resin made by Tohto Kasei KK

*3: YX-4000: a bisphenol type epoxy resin made by Yuka Shell Epoxy KK

* 4: DEN-438: a phenol novolac epoxy resin made by Dow Chemical Co., Ltd

Assay method:

The resist compositions were each assayed as follows.

The resist compositions of examples and comparative examples as shown in Table 4 were each applied to the printed circuit substrates (obtained by laminating copper foil on an imide film) by screen printing to dry at80℃ for 20 minutes. Then, the applied membranes were each covered with the negative films and irradiated by an integrated dose of 500mJ/cm^2 of ultra-violet ray from an exposure device to form certain patterns. The membranes were developed with an organic solvent or an aqueous 1 wt% Na_2CO_3 solution and heated at 150℃ for 50 minutes to cure. The substrates thus prepared for test were assayed on the properties in alkali development, soldering-heat resistance, flexibility, heat-deterioration resistance and nonelectrolytic gold-plating resistance. The results are shown in Table 4. The assay methods and the assay standards were as follows:

(1) Development:

The applied membrane was dried at 80℃ for 60 minutes, followed by spraying an aqueous 1% sodium carbonate solution of 30℃ for developing to assay the development.

○: no visual residue

×: a visual residue

(2) Soldering-heat resistance:

A rosin flux was applied to the test substrate, which was dipped in a melted solder bath of 260℃ for 10 seconds. The